Réseau de transport d'électricité

Market design for Demand Response: the French experience

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July 3, 2014 – International Energy Agency

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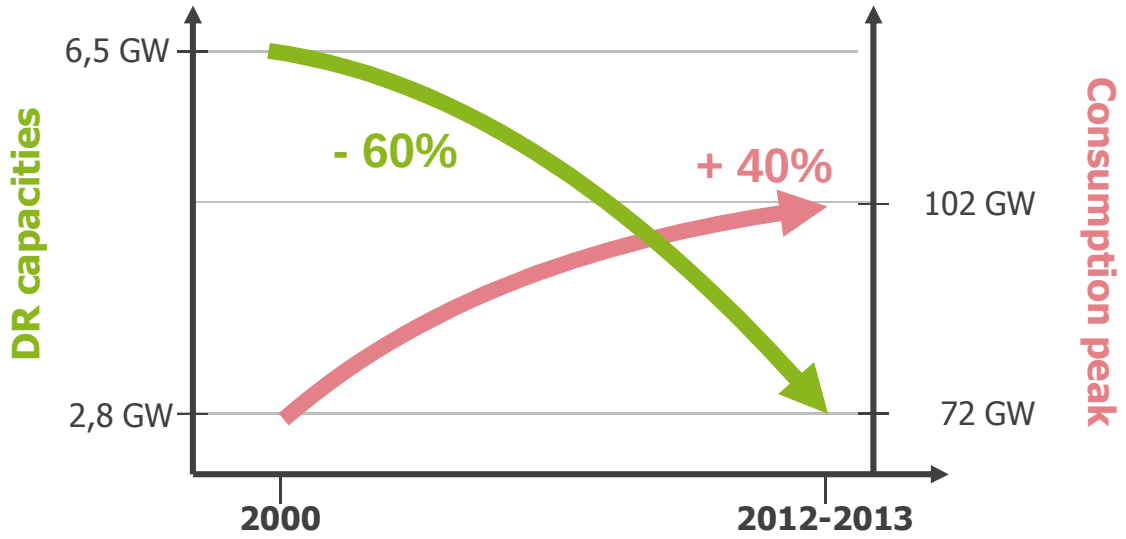
SETTING THE STAGE

Back in 2010: concerns about DR penetration

France was initially a country with large DR participation… but since market opening, a gradual decrease in DR capacities whereas peak load has become more and more important



WG convened in 2010 → conclusion that some regulatory and technical obstacles were preventing the development of DR in France

Back in 2010: concerns about DR penetration

Traditional obstacles to DSM development are now well identified

Regulatory / market design

- Institutional framework: DSM **pure players** want to access the market and compete with suppliers to value flexibility in markets whereas traditional regulation is supplier-focused → competition can be hampered
- Public policy: **positive externalities** associated to load control (security of supply, decrease in GES emissions, etc.) are not properly integrated into markets → lack of incentive to develop DR

Technical

- **Barriers to aggregation** of capacities (individual control on each of them whereas it is the pooling effect that brings value)
- **Barriers to participation of small capacities** connected to distribution grids (e.g. no smart meters, lack of confidence towards data used by DSM operators)

Addressing them requires strong political commitment and technical involvement

Regulatory / market design

- **A level playing field** should be implemented between suppliers and independent DSM operators → aggregators should be able to participate to all markets as a resource (supply side) - later confirmed by Competition Authority rulings
- **Public policies** can recognize positive effects through (i) market redesign (e/g/ capacity markets) and (ii) dedicated public policies to value externalities

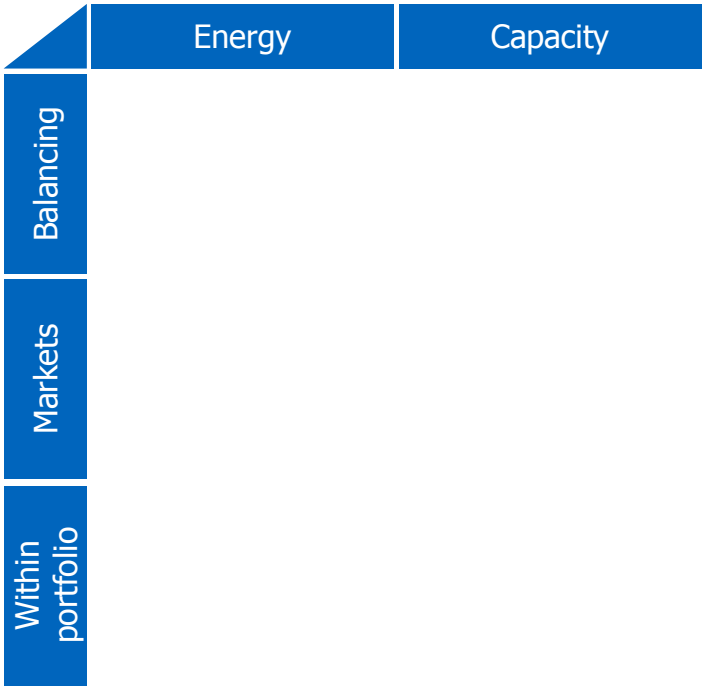
Technical

- Aggregation should be encouraged through **adapted control methods** (e.g. no restriction to aggregation as regards the size, location or connecting grid of capacities)
- Data collected by DSM operators can be used **under a regulated regime** (e.g. certification) in the absence of smart meter

Different stages in market design

Full participation of demand-side is needed to reflect all the components of its value (EC, 2013)

How does it translate in the French market design ?



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Stage 1: regulatory regime before 2010

- Predefined tariffs (even when dynamic)
- Specific products providing little flexibility (D-1 signals, no RT action)

	Energy	Capacity
Balancing		
Markets		
Within portfolio	**Portfolio optimization for suppliers (sourcing vs sales)**	

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Stage 2: DSM-compatible market design

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- **Adapted governance framework** to enable the participation of independent DSM Operator
- **Specific products** tailored to enable DSM participation in all markets (but with equal conditions to other products)

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Markets	**Participation as a resource in energy markets**	**Participation as a resource in capacity market**
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Stage 4: Public support for DSM in market design

- Support schemes

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Stage 3: DSM-friendly market design

Adapted governance

Stage 2: DSM-compatible market design

Stage 1:

How does it translate in the French market design ?

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Stage 1 arrangements have proved efficient before market opening (6 GW in year 2000), but the potential then dropped to 2 GW.

In France, a program was launch in 2010 to open all markets to <u>explicit</u> DR participation (stage 3)

Recent law provides for possibilities to reach stage 4 (support must be based on proven externalities – debate over regime based on the "net benefit" analysis decided by FERC in the USA)

DSM has already become a new market *per se*, where independent new entrants compete with incumbent suppliers

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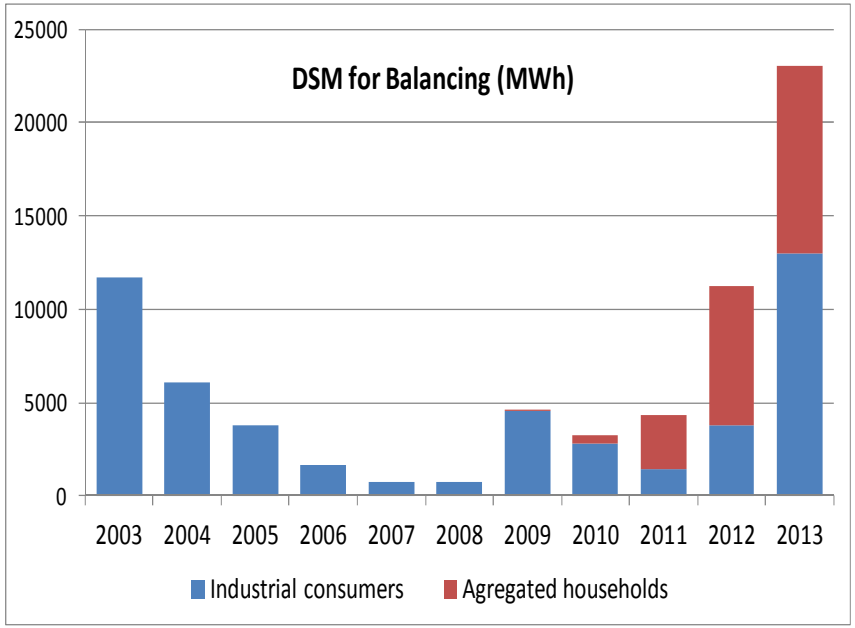
A '3 YEARS' TARGET: REMOVE REGULATORY CONSTRAINTS & OPEN ALL THE MARKETS TO DR IN FRANCE

DSM integration in all the markets in France

Balancing / ancillary services

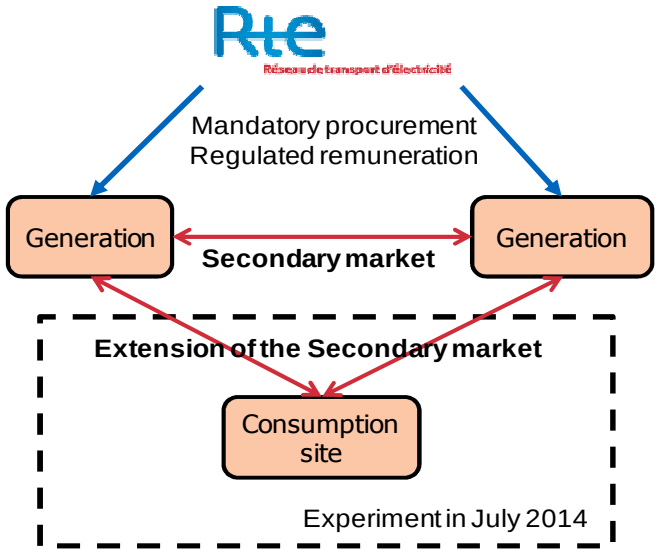
Balancing Mechanism

Industrial consumers fully integrated since 2003
Aggregated lod Balancing experiment since 2007



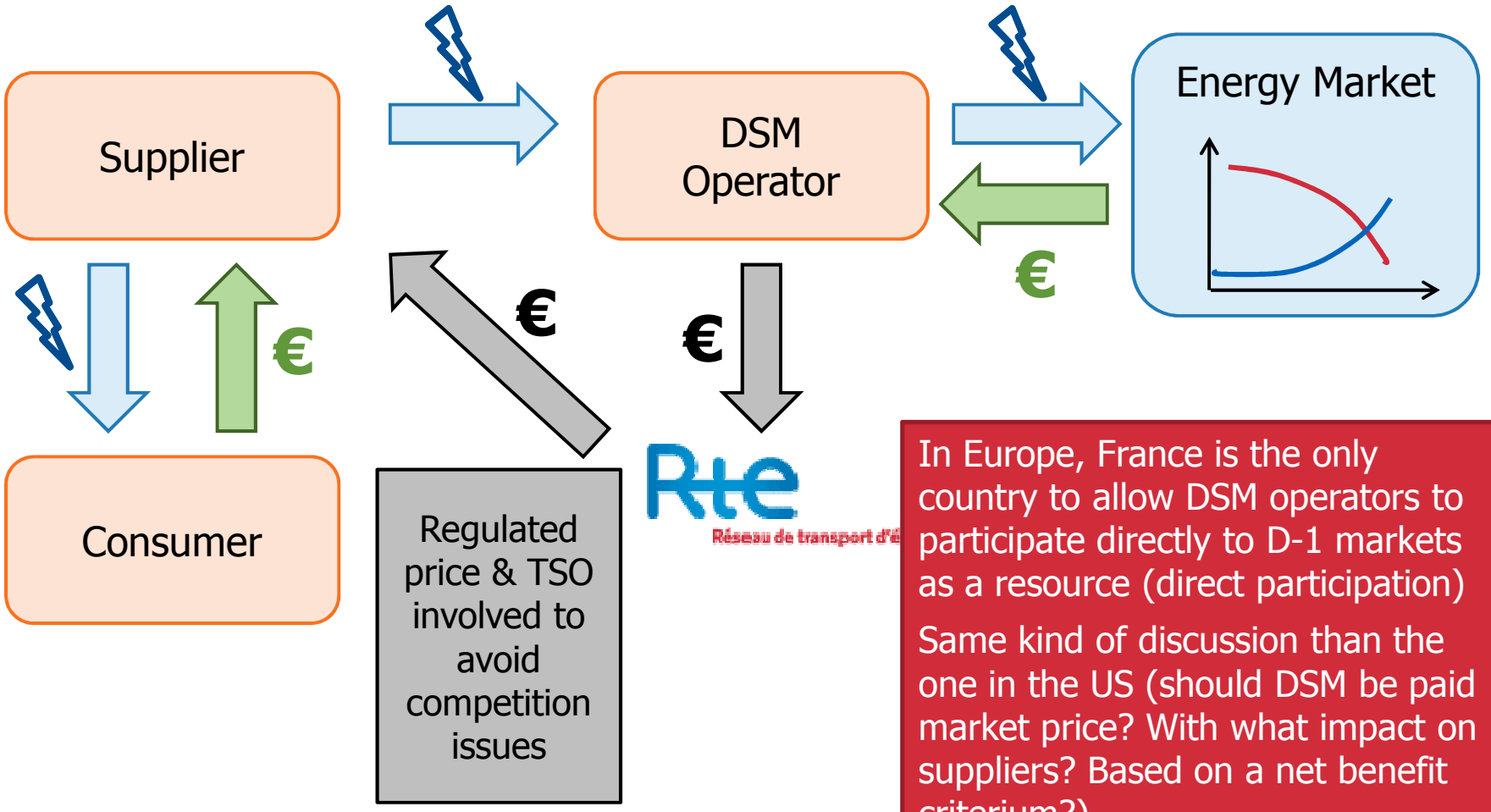
Ancillary services

Bilateral market for primary & secondary frequency reserves open to DSM (certificated consumption sites, industrial & aggregated load) in July 2014



DSM integration in all the markets in France

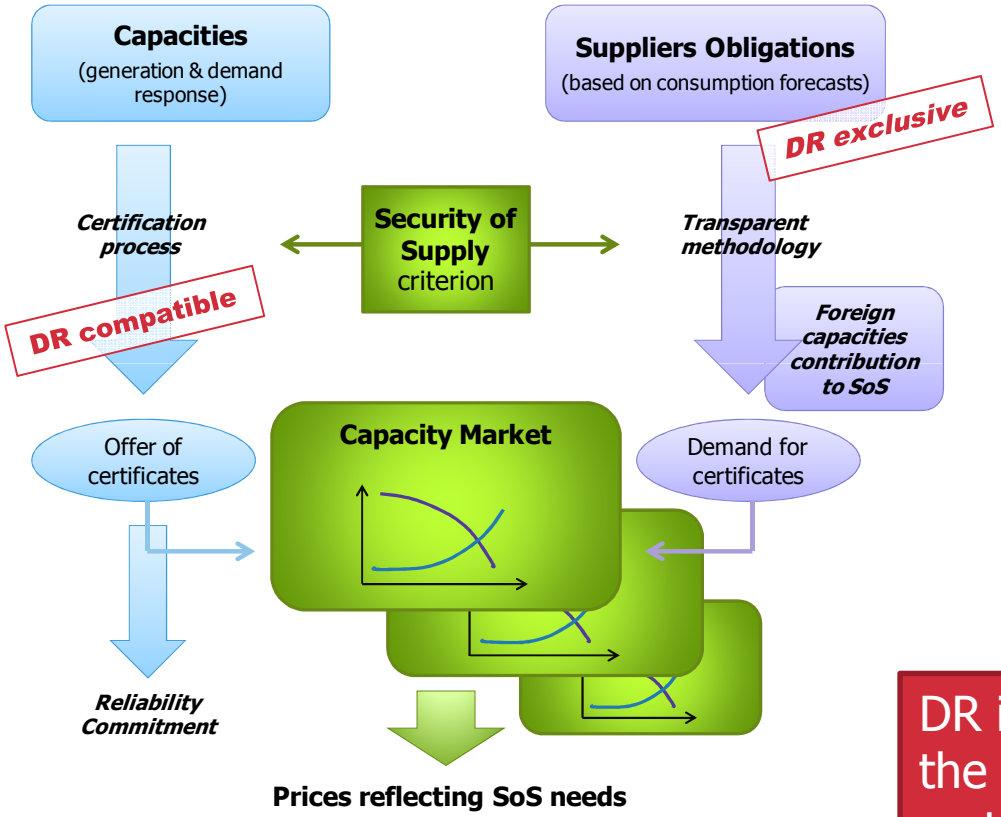
Energy markets



In Europe, France is the only country to allow DSM operators to participate directly to D-1 markets as a resource (direct participation)

Same kind of discussion than the one in the US (should DSM be paid market price? With what impact on suppliers? Based on a net benefit criterium?)

DSM integration in all the markets in France
Capacity markets



French capacity market

DR contributes to SoS : 2 possibilities to participate to the French capacity market (chosen by DR owner)

→ Explicitly through certification (asa resource)

Similar to generation
Requires correction of load
Well adapted to « easily certified » DR

→ Implicitly through obligation reduction

No certification
No load correction
Well adapted for difficult to assess DR

DR is expected to be price-setter in the French CRM (possibility to get certificates closer to real time, short peaking periods making DR operators particularly suitable to compete, etc.)

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KEY REMAINING QUESTIONS ABOUT MARKET DESIGN

How the public policy debate did structure in France

1st debate: should DSM operators :

- be restricted to propose load management services to suppliers (« implicit valuation »)

- or authorized to directly value load reduction in energy/capacity markets? (« explicit valuation » - participating as a resource)

Direct participation to the French Balancing Mechanism opened for DSM operators since 2003… but questioned for energy and capacity

Other options (specific market for DR, « implicit only » system to reduce transaction costs) have been contemplated but not pursued

A new role in the institutional organization of the power industry to shape: that of the independent DSM operators

2nd debate : how to regulate the interface between independent DSM operators and suppliers?

Historically, the interface has been organized on negotiated bases, but various reasons (inc. competition concerns) have questioned this model as from 2007

First debate – the DSM Operator

Who should be in charge of DSM ?

Suppliers in charge of DSM ?

•DR for portfolio optimization exists and can further develop with adequate tariffs

• Suppliers' core business is to sell energy
→ Mixed incentives to develop DSM beyond portfolio optimisation?

Consumers in charge of DSM ?

• High transaction costs & complexity, especially for small consumers (residential load)

→ Consumers are generally not willing to do it themselves (except for extreme prices)

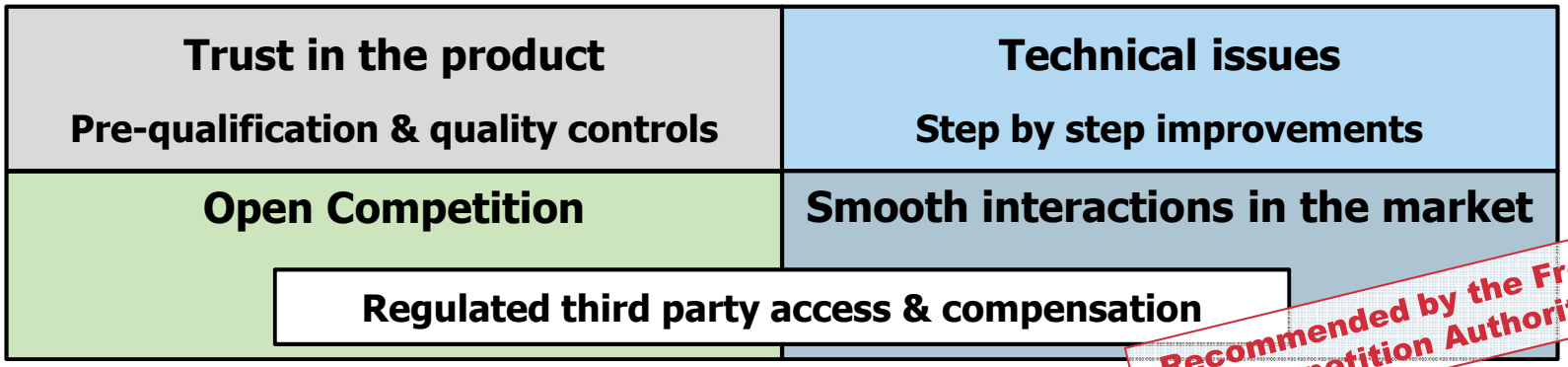
There is room for a new type of market party, the Independent DSM Operator

Requirements

Open access to demand side potential

Open (explicit) access to markets

Second debate – the regulatory framework



Two rulings from Competition authority (2012 and 2013) with important consequences:

- Suppliers and independent DSM operators are competitors (i) for contracting with consumers and (ii) for selling energy/capacity (two-sided market)
- Any DSM operator shall have the right to implement load reduction to sell the corresponding energy **without agreement from the supplier** → requires a regulated interface rather than a contractual one between the two → **this is a form of unbundling**
- control and monitoring tasks should be performed by the TSO

Second debate – the regulatory framework

Regulating the interface between suppliers and independent DSM operators requires to address the question of energy

- Financial transfers between DSM operators and suppliers must be settled in order to maintain markets rationale (participants are paid for what they deliver - the "just compensation") and maximize social welfare
- **But no more**: reverse payments should not be aimed at compensating suppliers for the loss of any commercial opportunities due to DR
- In decentralized markets such as European energy ones (no central dispatch), solution implemented in the US cannot be simply transferred: BSP perimeters must be corrected and according financial settlements made
- Data transfers should be carefully regulated, making them anonymous if necessary: suppliers will not be told the identity of DSM operators that intervene
- the TSO thus intervenes as an interface between parties to enable financial settlements and data transfer between competitors

→ Brottes Law (2013) creates a regulated and non-discriminatory access for DSM operators to consumers – this form of unbundling requires a new set of technical rules that takes time to draft

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FROM TECHNICAL PARITY TO EXPLICIT SUPPORT ?

Public support for DSM – Content of a premium

DR is supposed to provide some benefits to the collectivity.

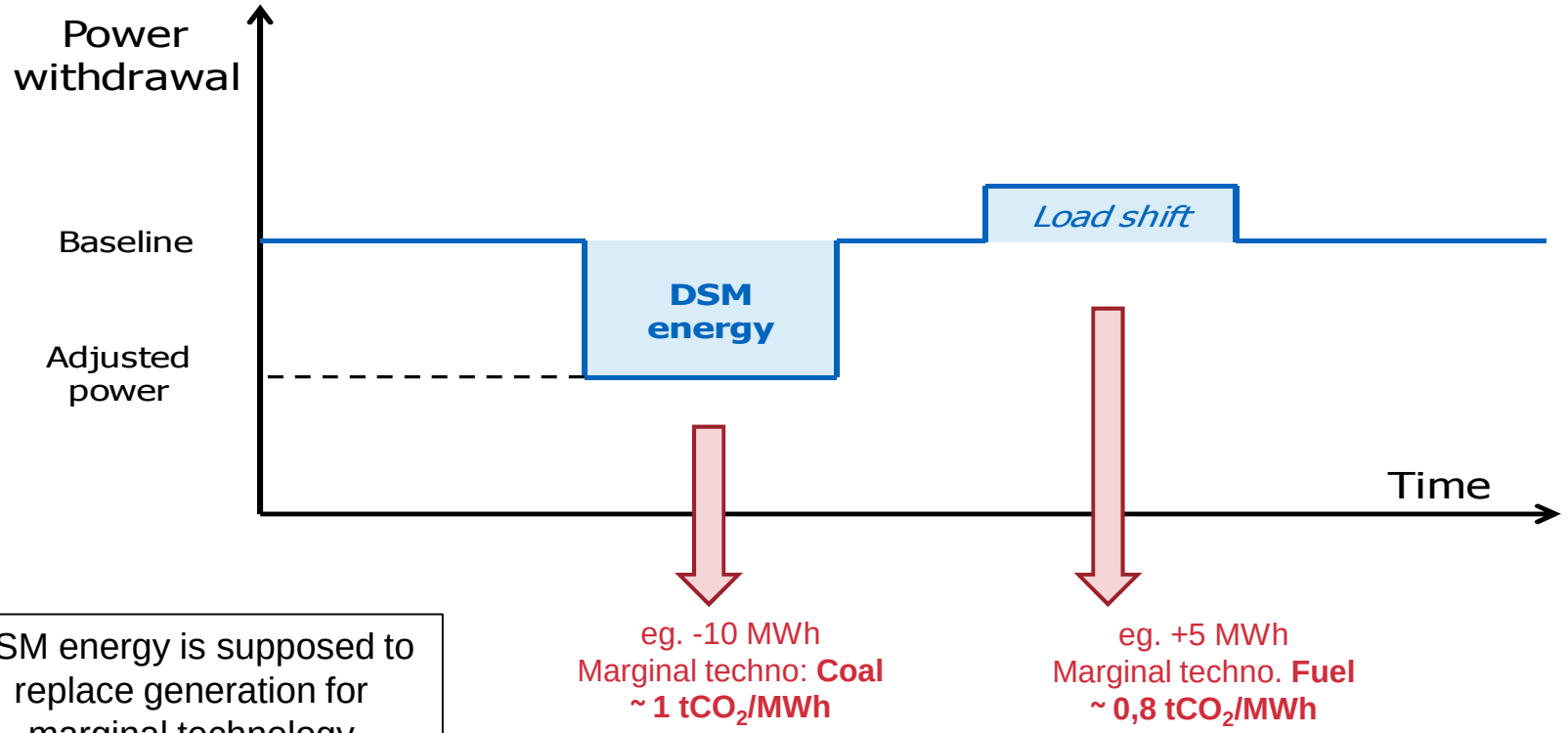
In the electric sector	Out of the electric sector
• Production savings due to consumption decrease • Contribution to the security of supply • Network savings (losses, avoided infrastructure reinforcements) • Increase of electric system's flexibility • Reduction of GHG emissions • Reduction of the potential market power of actors on wholesale market • Energy savings	• Jobs creation • Innovation • Competitivity • …

Pricing these externalities allows DSM actors to be incentivized vis-à-vis the improvement in social welfare they make possible

<u>BUT</u> Difficulty to assess the level of the externality & to fine-tune the corresponding level of public support

Premium has to be designed carefully

Taking delayed consumption into account



DSM energy is supposed to replace generation for marginal technology

→ **Avoids corresponding CO_2 emission**

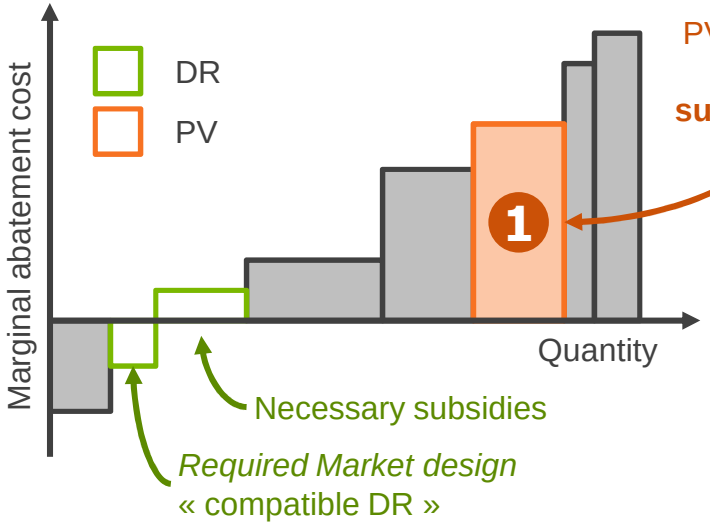
For CO2 value = 30€/tCO_2, DSM externality =

→ 30€/MWh of DSM without delayed consumption

→ 18€/MWh of DSM with delayed consumption

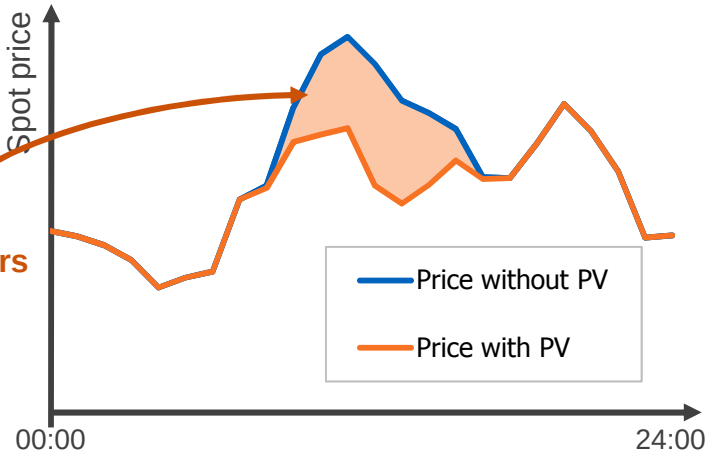
Premium has to be designed carefully

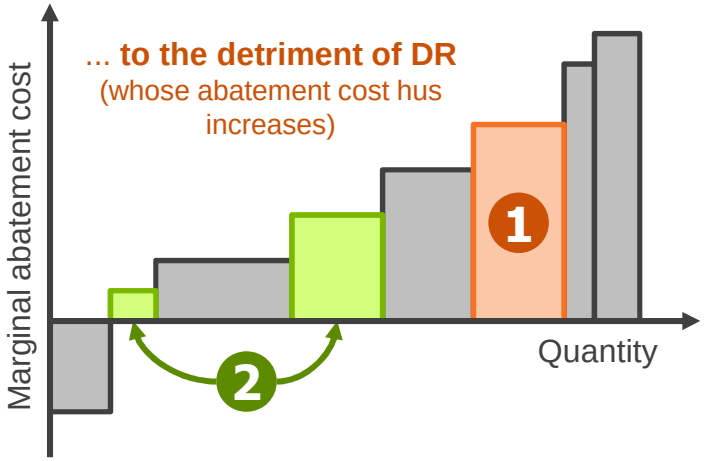
The effet of bad technological choices



PV is given **high subsidies**...

... and **lowers market price**...





... **to the detriment of DR** (whose abatement cost hus increases)

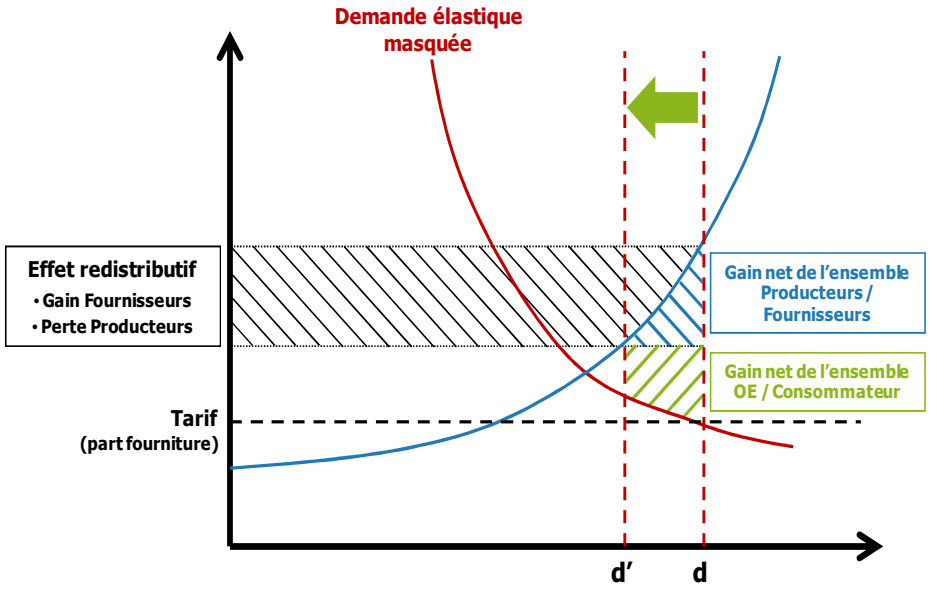
Finally, the very high abatement cost of PV is **paid two times** because this option **makes DR more expensive collectivly**.

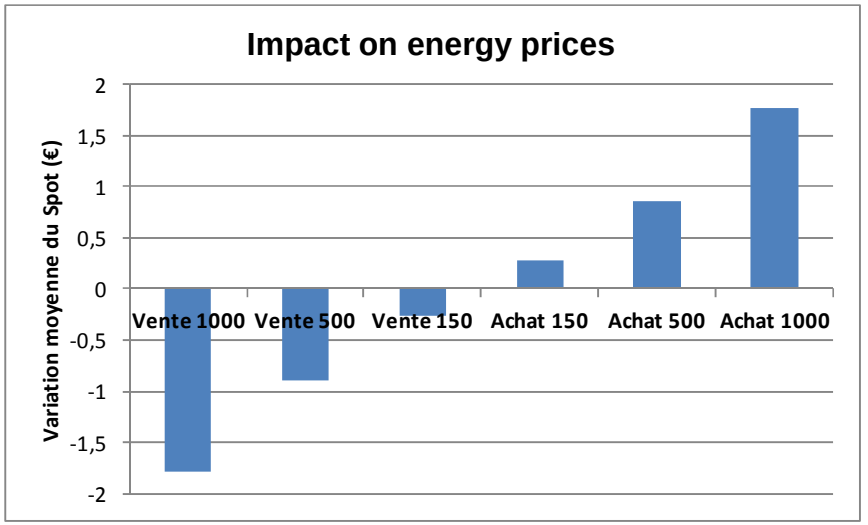
Theoretical cost

Practical cost (not counted the too expensive support to PV)

Impact of DSM on spot prices and stakeholders

What is the impact of DSM on prices and stakeholders ?





Introducing DSM creates distribution effects on the whole value chain in addition to social welfare gains.

RTE has performed economic studies showing that price variations induced by DSM lead to distributional effects (in favour of consumers) that are bigger than social welfare gains (6 times higher in our case)

CONCLUSION

• Demand Side Management is central in the energy policy in France, with **strong political support** (« Brottes law »).

• The **potential for Demand Response is high**: Stakeholders evaluate the potential capacity to several GW (aggregated & industrial).

• Demand Response development requires **full participation** to all aspects of the market design: **achieved in France in 2014**

	Energy	Capacity
Balancing	**Balancing markets open to DSM**	**Reserves / AS procurement open to DSM**
Markets	**Direct valuation in energy markets**	**Capacity certificates for DSM**
Within portfolio	**Portfolio optimization for suppliers (sourcing vs sales)**	**DSM reduces individual contribution to SoS**

• **Social welfare gains are expected from**

Integration in energy markets (peak-shaving)

• **Challenges :**

o Assessment, certification, performance monitoring

o Data management: commercial confidentiality & privacy protection

o Dealing with load shifting (operational & market design considerations)

o Regulatory framework: Economic parameters determination